

The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.

Paper No. 41

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte GRAHAM D. TATTERSALL

Appeal No. 1998-1903
Application No. 08/353,258

HEARD: November 29, 2000

Before HAIRSTON, GROSS, and LEVY, Administrative Patent Judges.
GROSS, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal from the examiner's final rejection of claims 1 through 8, 11 through 15, 17, and 21. Claims 18 through 20 and 22 have been allowed, and claims 9, 10, and 16 have been objected to as depending from rejected base claims.

Appellant's invention relates to a pattern recognition device and method of training such a device in which the input digital signal values are encoded. The code used either is

redundant with a normalized Hamming distance to normalized input signal value distance relationship with a mean slope greater than 1 for input signal value distances up to at least 10% of the maximum input signal value distance or has a higher monotonicity than a binary code and has a number of bits between that required for the binary code and that required for a bar code. Claims 12 and 13 are illustrative of the claimed invention, and they read as follows:

12. A method of training a pattern recognition device which is arranged to receive a set of digital input signal values representing a pattern of physical occurrences distributed over time or space to be recognized comprising the steps of:

encoding said digital input signal values into coded input signal values to form a digital signal representation of said pattern using a redundant code which has a normalized Hamming distance to normalized input signal value distance relationship with a mean slope greater than 1 for input signal value distances up to a predetermined level of at least 10% of the maximum input signal value distance; and

using the coded input signal values to recognize the pattern of physical occurrences.

13. A method of training a pattern recognition device which is arranged to receive a set of digital input signal values representing a pattern of physical occurrences distributed over time or space to be recognized comprising the steps of:

encoding said digital input signal values using a code employing a number of bits which is:

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i) greater than that which a binary code would require to represent an equal number of signal levels; and

ii) less than that which a bar code would require to represent an equal number of signal levels;

and being selected to have a higher monotonicity than would such a binary code; and

using the coded input signal values to recognize the pattern of physical occurrences.

The prior art references of record relied upon by the examiner in rejecting the appealed claims are:

Johnston	4,782,459	Nov. 01,
1988		

Aleksander and T.J. Stonham, "Guide to pattern recognition using random-access memories," Computers and Digital Techniques, vol. 2, No. 1 (February 1979), pp. 29-40.

(Aleksander)

Claims 1 through 8, 11 through 15, 17, and 21 stand rejected under 35 U.S.C. § 103 as being unpatentable over Johnston in view of Aleksander.

Reference is made to the Final Rejection (Paper No. 26, mailed May 15, 1996) and the Examiner's Answer (Paper No. 37, mailed January 21, 1998) for the examiner's complete reasoning in support of the rejection, and to appellant's Brief (Paper

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No. 28, filed November 14, 1996) and Supplemental Brief (Paper No. 34, filed August 28, 1997) for appellant's arguments thereagainst.

OPINION

We have carefully considered the claims, the applied prior art references, and the respective positions articulated by appellant and the examiner. As a consequence of our review, we will reverse the obviousness rejection of claims 1 through 8, 11 through 15, 17, and 21.

Both the examiner and appellant apparently agree that Johnston does not disclose a means for or step of encoding, as recited in each of the independent claims. We too agree that Johnston lacks any teaching of encoding. The examiner relies on Aleksander to provide the particular encoding specified in the claims. However, we find Aleksander's disclosure to be insufficient to meet the limitations in the claims, as discussed infra.

Aleksander discusses (second column, page 36) three types of codes, a direct binary code, a reflexive Gray code (which has the same number of bits as a binary code), and a 1-in-n code (hereinafter referred to as a bar code). In particular,

Aleksander explains that both the binary code and the Gray code have problems with the Hamming distance, and, whereas the bar code overcomes Hamming distance problems, it is inefficient and requires a large amount of input space.

Each of independent claims 1, 12, 14, and 21 requires the code used for encoding to be redundant and the relationship of the input signal value Hamming distance to the input signal value distance to have a mean slope greater than 1. Neither the binary code nor the Gray code is redundant, as recognized by the examiner (Final Rejection, page 4). Nonetheless, the examiner concludes (Final Rejection, pages 4-5), that a Gray code satisfies the claimed code, since a Gray code has the claimed "normalized Hamming distance to normalized signal distance relationship" and "is more efficient than the redundant code." The examiner further contends (Answer, page 4) that "the redundant code as claimed does not patentably distinguish over the Gray code, and the invention would perform equally well with the Gray code," since the redundant code does not "provide any improvement over the Gray code in the classification of input patterns."

The examiner, however, has applied an erroneous standard for obviousness. The test is not whether the claimed code is better than the prior art, but rather whether it would have been obvious to modify the prior art to obtain the claimed code. In other words, it is improper to ignore a limitation whether or not the examiner believes it to provide an improvement over the prior art. Thus, whether or not the "the invention would perform equally well with the Gray code" is irrelevant in determining the obviousness of the claimed invention. Since the examiner has admitted that the Gray code is not redundant, the Gray code alone fails to satisfy the claimed code. The issue then becomes whether or not it would have been obvious to modify the Gray code to have redundancy.

The examiner argues (Final Rejection and Answer, page 5) that Aleksander suggests that there is a tradeoff between data redundancy and Hamming-distance problems. As evidence, the examiner refers to Aleksander's statement (page 36, column 2) that the bar code "overcomes all the Hamming-distance problems ... [but] is, however, very inefficient and can require a large amount of input space." However, although the bar code is known to be redundant, Aleksander does not relate the

redundant characteristic of the bar code to the absence of Hamming-distance problems. Therefore, Aleksander does not suggest that redundancy is a result effective variable which can be optimized. Thus, contrary to the examiner's assertion (Final Rejection and Answer, page 5), Aleksander does not suggest varying the redundancy of (or, rather, adding redundancy to) the Gray code. In addition, there is no teaching or even a hint in Aleksander as to how one would or could add redundancy to the Gray code. The examiner's motivation for doing so thus is based solely on hindsight. Therefore, the examiner has failed to establish a prima facie case of obviousness, and we cannot sustain the rejection of claims 1, 12, 14, and 21 and their dependents, claims 2 and 7, 15, and 17.

Regarding claims 8 and 13, the examiner advances the same line of reasoning considered supra for combining properties of the bar code and the Gray code. Since we have already determined that the references lack a teaching to modify the Gray code, we will reverse the rejection of claims 8 and 13, as well as claim 11, which depends from 8.

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CONCLUSION

The decision of the examiner rejecting claims 1 through 8, 11 through 15, 17, and 21 under 35 U.S.C. § 103 is reversed.

REVERSED

KENNETH W. HAIRSTON)	
Administrative Patent Judge)	
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)	BOARD OF PATENT
ANITA PELLMAN GROSS)	APPEALS
Administrative Patent Judge)	AND
)	INTERFERENCES
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STUART S. LEVY)	
Administrative Patent Judge)	

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